

Massachusetts Institute of Technology  
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LUMINARY Memo #134

To: Distribution  
From: Dana Densmore  
Date: 19 January 1970  
Subject: LUMINARY Revisions 136-139

- 1) CALCN85 (ten words) was moved from bank 36 to bank 32 to make room for implementation of PCR 872.2. CALCN35 is entered via DXCHZ, leaves via POSTJUMP, and uses only interpretive sub-routines.
- 2) (PCR 294) Fixed memory LM mass property HIDESCNT, the maximum value in the reasonableness test for LEMMASS, was updated to 16,700 KG. Its former value was almost 200 lbs. less than the actual weight of the Apollo 12 lunar module.
- 3) Flag definitions for NOR29FLG were removed (PCR 892, delete R29). Flag entries for HFAILFLG and VFAILFLG were inserted into the alphabetic flag index.
- 4) The tag 50ERASE (the altitude below which landing radar updates are not made) was changed to "HLROFF" to be more descriptive and flexible.
- 5) (PCR 872.2) a) A restart table entry (6.11SPOT) was added to restart DYNMDISP in P41 without restarting the V16N85 display.  
b) Coding was added in DYNMDISP to calculate time till ignition (TFI) so that it will be available for N40. c) DYNMDISP was started up before R60 rather than afterwards so the N40 display will be available to the astronaut.
- 6) (PCR 287) Priority alarm 526 in P20 and P22 was replaced by calculation of range and range rate for N54 ( $R$ ,  $\dot{R}$ ,  $\theta$ ) until range  $< 400$  n.m. Range and range rate are computed and theta is set to zero. If it is the first pass through the coding for  $> 400$  n.m. and

the LM is on the lunar surface, the alarm light is turned on. Otherwise a monitor V16N54 is displayed.

- 7) (Anomaly L-1B-11) Temporary scaling shifts were put into the mass computations to reduce large terminal errors by a factor of 16.
- 8) HCALC was sign agreed after being calculated and before being stored in MUNRVG in SERVICER. This is so that in 30KCHK the low order word won't overflow into the high order word.
- 9) In the change to not do LR updates below 50' (PCR 942) the flag LRINH was set in an attempt to inhibit further updates. The flag has inverse logic, however, and it must be cleared to inhibit updates. This was done.
- 10) Three words were saved in Bank 1 (ACB L-14) in order to make room to implement PCR 872.2. Three GENADRs in the Restarts Routine were equated to equivalents in fixed-fixed.
- 11) (PCR 986.2) The PIOS ephemeris data, the LOSSEM ephemeris and the star table were updated for the 1970-1971 ephemeris year.

#### Changes to LUMINARY GSOP:

Section 4 should reflect the changes described above in (5), (6), and (9).

Section 2 should reflect the change described above in (3).

Section 3 should reflect the change described above in (2).